

Climate change in Africa: Evidence, mechanisms and impacts - Past and present

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Climate changes in Africa have a tremendous impact on ecosystems and human societies. Climate change-related risks are aggravated in Africa by the deficient data availability and research efforts which create major knowledge gaps and uncertainties.

In an attempt to build synergy and promote climate change research in Africa, the multi-disciplinary conference CCA2017 (Climate Change in Africa, vulpesproject.wix.com/workshop) was organized at the Cadi Ayyad University of Marrakesh.

The primary goal was to gather scientists from complementary disciplines including Earth sciences, (paleo-)oceanography, (paleo-)climatology, climate modeling, ecology, and archaeology, for a multidisciplinary assessment of the latest results and to start discussions related to climate change and its

impacts, from past natural variability to modern changes and future projections.

CCA2017 was attended by 80 delegates from 20 countries including eight African countries (Algeria, Benin, Cameroon, Congo, Morocco, Senegal, South Africa and Tunisia). Travel support was offered by PAGES for three African early-career scientists who presented their work in both posters and oral presentations. The conference consisted of five sessions: (1) on climate change mechanisms in Africa including links between orbital forcing and inter-annual rainfall variability, extreme precipitation over Africa, dust fluctuations during the African Humid Period, predicting the Sahel summer rainfall, and the variability of the West African monsoon; (2) dedicated to the climate impacts on eco- and agro-systems. This session gathered presentations on the cultural resilience of the

NE Sahara facing problems of surface water storage, the sustainability and resilience in the Congo Basin, the conditions under which forests grow in Central Africa, the impacts on ecosystem functions and services in Sub-Saharan Africa, the history of mountain forests in central Africa, and finally the use of plant DNA to explore the imprints left by past climate changes in Tropical flora; (3) on tropical teleconnections and monsoon systems, which showcased talks on precipitation responses during recent El Niño events, the teleconnection patterns during the last millennium in NW Africa, the trends, rhythms and transitions in East Africa, and the anthropogenic impact on the Sahel climate; (4) dedicated to the Mediterranean region presenting the past droughts and flooding in the Levant, the climate conditions around the Red Sea and Dead Sea during the Last Interglacial, the timings and mechanisms of Holocene environmental changes in Morocco (Fig. 1) and Tunisia, the role of microclimates in preserving plant species in microrefugia, as well as how to predict plant species, future range using vegetation modeling; (5) focused on land-ocean links including oceanic variability in the southern Benguela upwelling system and their implications for increased Agulhas leakage during the late Holocene, the seasonal sea surface temperatures off South Africa, climate variability and its driving forces in southern Africa, and the vegetation dynamics during the Holocene in Benin.

The three-day meeting was followed by a two-day field excursion into the Moroccan desert in which 35 delegates took part. This was a fantastic opportunity to pursue scientific discussions while experiencing one of the most extreme environments on Earth.

The group strongly felt that although climate mechanisms and impacts can be partially studied by the international community without ever being in Africa, all climate change studies ultimately rely on field data. We therefore call for an increased international scientific effort toward field science involving institutional cooperation with local scientists.

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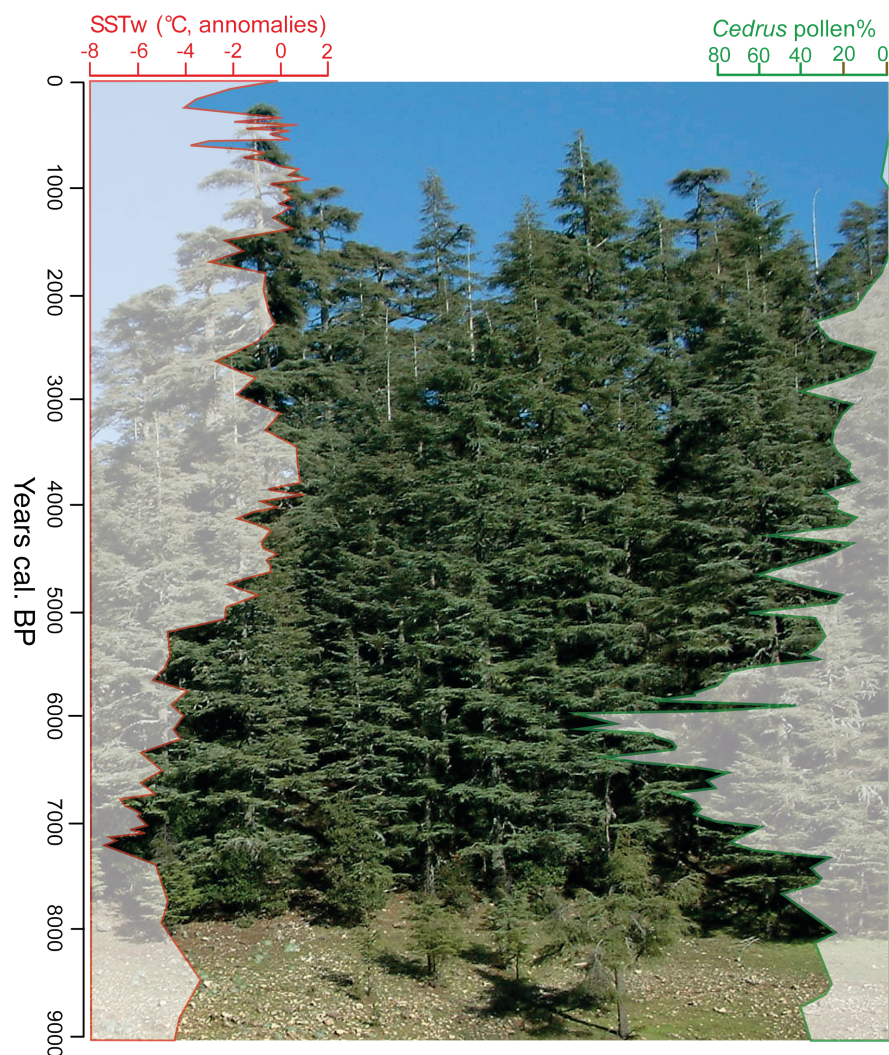


Figure 1: Will the ongoing climate change in Africa lead to an extinction of some endemic species (Cheddadi et al. 2017)?